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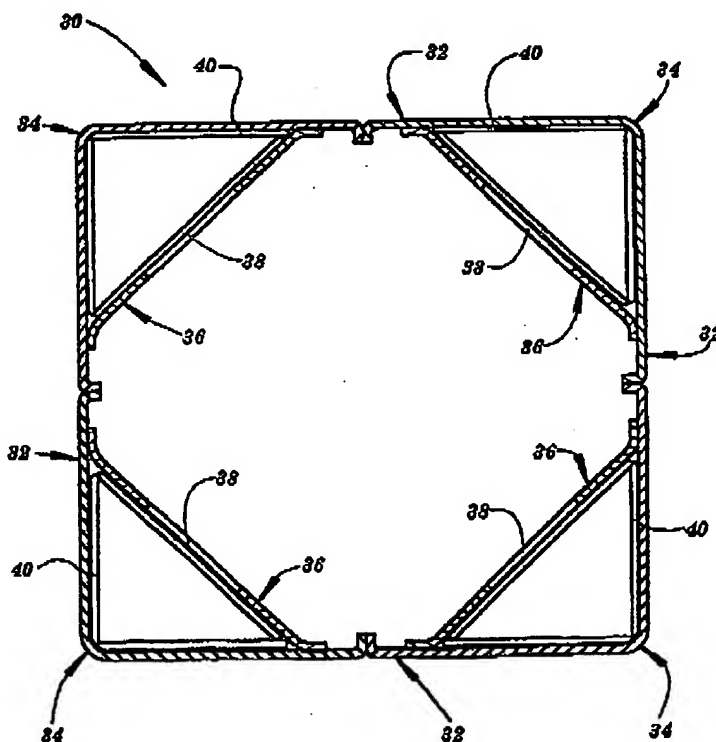
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- (72) Inventors: NICKELL, Craig, Alan; 1717 Alpine Drive, Sherman, TX 75092 (US). BROWN, Bobby, Glenn; 1819 South Center, Dennison, TX 75021 (US). EISENBARTH, For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: STACKABLE FLEXIBLE INTERMEDIATE BULK CONTAINER



(57) Abstract: A baffle-type bulk bag (10) is reinforced with triangular support members (40, 60, 74, 84, 94) positioned in the triangular corners (34) of the bulk bag to facilitate stacking. The bulk bag may include double layer side walls (52) having support panels (62) received therein.

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STACKABLE FLEXIBLE INTERMEDIATE BULK CONTAINER

TECHNICAL FIELD

The present invention relates generally to flexible intermediate bulk containers, also known as bulk bags, and more particularly to baffle-type bulk bags which are adapted for stacking one on top of another.

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BACKGROUND AND SUMMARY OF THE INVENTION

Over the past thirty years flexible intermediate bulk containers, commonly known as bulk bags, have come into widespread use for receiving, storing, transporting, and discharging flowable materials of all types. Although circular bulk bags are known, bulk bags are typically constructed from rectangular panels which are sewn together along their adjacent edges to define a bulk bag which is initially square or rectangular in horizontal cross section. Nevertheless, all bulk bags, whether initially square, rectangular, or circular in cross section tend to assume a circular configuration when filled due to the uniform pressure imposed by the contents of the bulk bag against the flexible fabric side walls thereof.

U.S. patent number 4,903,859 discloses a bulk bag comprising four double layer side walls. Stiffeners formed from cardboard are inserted between the layers of the side walls thereby imparting sufficient rigidity to the container for permit its use with liquids. Although the bulk bag of the '859 patent has been generally well received, its utilization has been somewhat limited by the fact that it cannot be stacked.

Co-pending application serial number 09/390,403 assigned to the assignee hereof (doing business as Composite Container Corp.) discloses an improvement over the bulk bag of the '859 patent. In application serial

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number 09/390,403 there is disclosed a bulk bag having double layer side walls and vertically extending corner pockets. Plywood sheets are received between the layers of the side walls and wooden posts are received in the corner pockets to provide a bulk bag suitable for use with liquids which is stackable.

U.S. patent number 5,076,710 discloses a baffle-type bulk bag wherein bridge panels or baffles are sewn across the four corners of a nominally rectangular bulk bag. The baffles prevent the side walls of the bulk bags from bulging outwardly when the bulk bag is filled, thereby retaining the filled bulk bag in a more or less rectangular cross-sectional configuration. The baffles may be provided with apertures which allow material to flow into and out of the corners of the bulk bag during filling and discharging operations.

The present invention comprises an improvement over the prior art as defined by the '859 and '710 patents and application serial number 09/340,403 to provide a baffle-type bulk bag which is stackable. In accordance with the broader aspects of the invention, triangular stiffeners are provided in the triangular corners of baffle-type bulk bags. The stiffeners may be formed from various materials including plastic panels, panels formed from corrugated paperboard and similar materials etc. The stiffeners may be provided with apertures aligned with the apertures of

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the baffles thereby permitting the flow of material into and out of the bulk bag during filling and discharging operations.

5 In accordance with another aspect of the invention, baffle-type bulk bags may be provided with double layer side walls extending between the baffles. In such instances stiffeners may be employed in the side walls of the bulk bag in addition to the stiffeners that are utilized in the triangular corners defined by the baffles.

10 In accordance with yet another aspect of the invention, there is provided an eight piece bulk bag side wall construction. An outer layer comprises four rectangular sections which are joined along seams disposed at the midpoints of the side walls of the bulk bag. An
15 inner layer also comprises four sections which are similarly joined by seams located at the midpoints of the bulk bag side walls. The inner and outer layers are in turn joined by vertically extended seams located adjacent the corners of the bulk bag thereby defining the baffles
20 and the double layer side walls of the bulk bag.

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BRIEF DESCRIPTION OF THE DRAWINGS

A more complete understanding of the invention may be had by reference to the following Detailed Description when taken in conjunction with the accompanying Drawings, wherein:

FIGURE 1 is an exploded perspective view of a prior art baffle-type bulk bag;

FIGURE 2 is a horizontal sectional view of the baffle-type bulk bag of FIGURE 1;

FIGURE 3 is a view similar to FIGURE 2 illustrating a first embodiment of the invention;

FIGURE 4 is a cross section of a plastic panel useful in the practice of the invention;

FIGURE 5 is a cross section of a corrugated panel useful in the practice of the invention;

FIGURE 6 is a horizontal sectional view of a bulk bag comprising a second embodiment of the invention; and

FIGURE 7 is a perspective view of a triangular support member useful in conjunction with the embodiments of the invention illustrated in FIGURES 3 and 6.

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DETAILED DESCRIPTION

Referring now to the Drawings, and particularly to FIGURE 1 thereof, there is shown a baffle-type bulk bag 10 of the type disclosed in U.S. patent number 5,076,710 granted December 31, 1991 to the assignee hereof. The bulk bag 10 comprises four side panels 12, a top panel 14, and a bottom panel 16. As will be appreciated by those skilled in the art, the top panel 14 may be provided with various types and kinds of fill chutes or spouts depending upon the requirements of particular applications of the invention. Likewise, the bottom panel 16 may be provided with various types and kinds of discharge chutes or spouts, or may comprise a plain bottom as shown, depending upon the requirements of particular application of the invention.

The bulk bag 10 is further illustrated in FIGURE 2. In its assembled configuration, the bulk bag 10 comprises four side walls 18 which are formed by joining adjacent side panels 12 along vertically extending seams 20 located at the midpoints of the side walls 18. The bulk bag 10 further comprises four corners 20.

A baffle 22 extends across each corner 20 of the bulk bag 10. The baffles 20 prevent the side walls 18 of the bulk bag 10 from bulging outwardly when the bulk bag 10 is filled, thereby retaining the filled bulk bag in a generally rectangular configuration. The baffles 22 are secured to the side panels 12 of the bulk bag by vertically

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extending seams 24. Referring simultaneously to FIGURES 1 and 2, the baffles 22 may be provided with apertures 24 to facilitate movement of material into and out of the corners of the bulk bag during filling and discharging operations.

5 Referring to FIGURE 3, there is shown a baffle-type bulk bag 30 incorporating a first embodiment of the invention. The bulk bag 30 is constructed similarly to the bulk bag 10 illustrated in FIGURES 1 and 2 and described hereandabove in conjunction therewith. Thus, the bulk bag
 10 30 comprises four side walls 32 which intersect at four corners 34. A baffle 36 extends across each corner 34. The baffles 36 may be provided with apertures 38 to facilitate the flow of material into and out of the triangular corners defined by the baffles during bulk bag
 15 filling and discharging operations.

In accordance with the present invention, each of the triangular corners of the bulk bag 30 as defined by the baffles 36 is provided with a stiffener 40. The stiffeners
 20 40 are preferably triangular in cross section and dimensioned to closely match the dimensions of the triangular corners of the bulk bag. The vertical dimensions of the stiffeners 40 are matched to the height of the bulk bag in which they are used, that is, the stiffeners 40 extend the entire distance between the upper
 25 and lower edges of the side walls 32 of the bulk bag 30.

The use of the stiffeners of the present invention in

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baffle-type bulk bags is highly advantageous in that it allows the bulk bags to be stacked. In this manner a substantially greater number of bulk bags can be received within a particular vehicle, warehouse, etc. than would be the case if the bulk bags are not stacked. By means of the invention, bulk bags can be stacked one upon another to a total height of three or more bulk bags depending upon the characteristics of the materials that are received within the bulk bags.

10 The stiffeners 40 of the present invention may be manufactured from plastic panels of the type sold by Coroplast of Dallas, Texas, under the trademark "COREX" (tm). FIGURE 4 illustrates the cross sectional configuration of the "COREX" panels. Other types of plastic panels may also be used, depending upon the requirements of particular applications of the invention. The triangular stiffeners of the present invention may also be formed from corrugated materials of the type having cross sections such as shown in FIGURE 5. Such panels may be formed from various types of paperboard, fiberboard, cardboard, and other materials, all of which are collectively referred to herein as "corrugated panels".

20 Referring to FIGURE 6, there is shown a bulk bag 50 incorporating a second embodiment of the invention. The bulk bag 50 comprises four side walls 52 which intersect at

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four corners 54. Baffles 56 extend across each of the corners 54. The baffles may be provided with apertures 58 to facilitate the movement of material into and out of the corners of the bulk bag 50 during filling and discharging operations.

In accordance with a second embodiment of the invention, triangular stiffeners 60 are positioned in each of the four corners of the bulk bag 50 as defined by the baffles 56. The triangular stiffeners 60 may be formed from various types of plastic panels, particularly including the plastic panels sold by Coroplast of Dallas, Texas, and identified by that company by the trademark "COREX" (tm). Alternatively, the triangular stiffener 60 may be formed from other types of plastic panels or from panels formed from corrugated materials such as paperboard, fiberboard, cardboard, and the like all of which are collectively referred to herein as "corrugated panels". Other types and kinds of materials may also be used in the fabrication of the triangular stiffener 60 depending upon the requirements of particularly applications of the invention.

The bulk bag 50 of FIGURE 6 differs from the bulk bag 30 of FIGURE 3 in that the side walls 52 thereof comprise double layer side walls. Stiffeners 62 are provided in each of the double layer side walls 52 comprising the bulk bag 50. The stiffener 62 may be formed from plastic panels

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of the type sold by Coroplast of Dallas, Texas, under the trademark "COREX" (tm) or from other types of plastic panels. Alternatively, the stiffener 62 may be corrugated panels as such term is hereinabove defined. Other types and kinds of materials may be utilized in the fabrication of the stiffeners 62 depending upon the requirements of particular applications of the invention.

The use of the stiffeners 62 in addition to the stiffener 62 as illustrated in FIGURE 5 is advantageous in that it further improves the stackability of baffle-type bulk bags incorporated in the invention. In this manner, a greater number of bulk bags can be stacked one upon another than would otherwise be possible. Alternatively, bulk bags containing denser materials may be stacked one upon another.

FIGURE 6 further illustrates a third embodiment of the invention. In accordance with the third embodiment, an eight piece bulk bag side panel construction is provided. As is illustrated in FIGURE 5, such construction provides bulk bag side walls which include both baffles extending across the corners of the bulk bag and double layer side walls extending between the baffles.

The side walls 52 of the bulk bag 50 are defined by an outer side wall panel 64 and an inner side wall panel 66. The outer side wall panel comprises four pieces which are joined together by seams 68 located at the midpoints of the

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side walls 62. The inner side wall panel is likewise comprised of four pieces which are joined together by seams 70 positioned opposite the seams 68. The outer side wall panel 64 is connected to the inner side wall panel 66 by
5 eight seams 72 thereby forming the baffles 56 and the double layer side walls of the bulk bag 50. The seams 72 are vertically disposed and preferably extend continuously between the upper and lower edges of the side walls 52.

FIGURES 7, 8, and 9 illustrate variations of the
10 construction of the stiffeners 60 illustrated in FIGURE 6 and described hereandabove in conjunction therewith. Referring particularly to FIGURE 7, there is shown a triangular stiffener 74 having reinforcing panels 76 extending inwardly from the apex 78 of the triangular
15 configuration to points adjacent the long leg 80 thereof. The panels 76 provide additional support which further facilitates the stacking of flexible intermediate bulk containers incorporated in the present invention.

FIGURE 8 illustrates a triangular stiffener 84 having
20 a single panel 86 extending inwardly from the apex 88 of the triangular configuration to a point adjacent the long leg 90 thereof. FIGURE 9 illustrates a triangular stiffener configuration 94 comprising separate triangles 96 which are positioned adjacent one another to form the
25 triangular stiffener 94. Other configurations of the triangular stiffeners of the present invention will suggest

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themselves to those skilled in the art.

FIGURE 10 further illustrates the triangular stiffeners 40, 60, 74, 84, and 94 as illustrated in FIGURES 3 and 6 through 9 and described hereandabove in conjunction therewith. The triangular stiffeners of the present invention may be provided with apertures 98 which are aligned with the apertures 38 of the baffles 36 of the bulk bag 30 shown in FIGURE 3 and with the apertures 58 of the baffle 56 of the bulk bag 50 shown in FIGURE 6. When employed the apertures 98 facilitate the movement of material into and out of the triangular corners of the bulk bag during bulk bag filling and discharging operations. FIGURE 10 further illustrates the height of the stiffeners 40, 60, 74, 84, and 94 as being substantially identical to the height of the side walls of the bulk bag in which the stiffeners are used.

It will therefore be understood that the present invention comprises an improved baffle-type bulk bag construction wherein triangular stiffeners are provided in the triangular corners of baffle-type bulk bags as defined by the baffles thereof. Bulk bags incorporating the invention may also be provided with double layer side walls extending between the baffles which receive stiffener panels to further enhance the stackability of the bulk bags. The invention further provides an eight piece bulk bag side wall construction which provides both baffles

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extending across the corners of the bulk bag and double layer side walls extending between the baffles.

Although preferred embodiments of the invention have been illustrated in the accompanying drawings and described in the foregoing Detailed Description, it will be understood that the invention is not limited to the embodiments disclosed, but is capable of numerous rearrangements, modifications, and substitutions of parts and elements without departing from the spirit of the invention.

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THE CLAIMS

What is claimed is:

1. For use in conjunction with a baffle-type bulk bag of the type comprising side walls extending to corners and baffles extending across the corners for maintaining the bulk bag in a relatively rectangular configuration when filled, the improvement comprising:

triangular support members substantially filling the triangular corners of the bulk bag defined by the baffles thereof and having a vertical dimension substantially coincident with the vertical dimension of the bulk bag.

2. The improvement according to Claim 1 wherein the triangular support members are formed from plastic panels.

3. The improvement according to Claim 1 wherein the triangular support members are formed from corrugated panels.

4. The improvement according to Claim 1 wherein the triangular support members contain apertures aligned with apertures of the baffles.

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5. For use in conjunction with a baffle-type bulk bag of the type comprising including double layer side wall portions and baffles extending across the corners for maintaining the bulk bag in relatively rectangular configuration when filled, the improvement comprising:

triangular support members substantially filling the triangular corners of the bulk bag defined by the baffles, and

stiffeners positioned in the double layer portions of the side walls.

6. The improvement according to Claim 5 wherein the triangular support members are formed from plastic panels.

7. The improvement according to Claim 5 wherein the triangular support members are formed from corrugated panels.

8. The improvement according to Claim 5 wherein the triangular support members contain apertures aligned with apertures of the baffles.

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9. A flexible container for receiving, transporting, and storing flowable materials comprising:

an inner side wall layer;

an outer side wall layer;

5 eight vertical seams joining the inner and outer side wall layers to form baffles extending across corners and double layer side walls extending between the baffles; stiffeners within the double layer side walls; and triangular support members within the corners.

10 10. The improvement according to Claim 9 wherein the triangular support members substantially fill the triangular corners of the bulk bag defined by the baffles and have a vertical dimension substantially coincident with the vertical dimension of the bulk bag.

15 11. The improvement according to Claim 10 wherein the triangular support members are formed from plastic panels.

12. The improvement according to Claim 10 wherein the triangular support members are formed from corrugated panels.

20 13. The improvement according to Claim 10 wherein the triangular support members contain apertures aligned with apertures of said baffles.

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14. The improvement according to Claim 9 wherein the stiffeners are formed from plastic panels.

15. The improvement according to Claim 9 wherein the stiffeners are formed from corrugated panels.

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AMENDED CLAIMS

[received by the International Bureau on 9 November 2000 (09.11.00);
original claims 1,5 and 9 amended; remaining claims unchanged (3 pages)]

1. In combination with a baffled bulk bag of the type comprising side walls extending to corners and baffles extending across the corners for maintaining the bulk bag in a relatively rectangular configuration when filled, the improvement which comprises:

triangular support members substantially filling the triangular corners of the bulk bag defined by the baffles thereof and having a vertical dimension substantially coincident with the vertical dimension of the bulk bag and comprising three substantially planar, substantially rigid panel positioned edge-to-edge in a triangular array and joined along at least two adjacent edges.

AMENDED SHEET (ARTICLE 19)

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5. In combination with a baffled bulk bag of the type comprising double layer side wall portions and baffles extending across the corners for maintaining the bulk bag in relatively rectangular configuration when filled, the improvement which comprises:

triangular support members substantially filling the triangular corners of the bulk bag defined by the baffles and comprising three substantially planar substantially rigid panels positioned edge-to-edge in a triangular array and joined along at least two adjacent edges;

stiffeners positioned in the double layer portions of the side walls.

AMENDED SHEET (ARTICLE 19)

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9. A flexible container for receiving, transporting, and storing flowable materials comprising:

- a substantially continuous inner side wall layer;
- a substantially continuous outer side wall layer;
- eight vertical seams joining the inner and outer side wall layers to form baffles extending across corners and double layer side walls extending between the baffles;
- stiffeners within the double layer side walls; and
- triangular support members within the corners and comprising three substantially planar, substantially rigid panels positioned edge-to-edge in a triangular array and joined along at least two adjacent edges.

AMENDED SHEET (ARTICLE 19)

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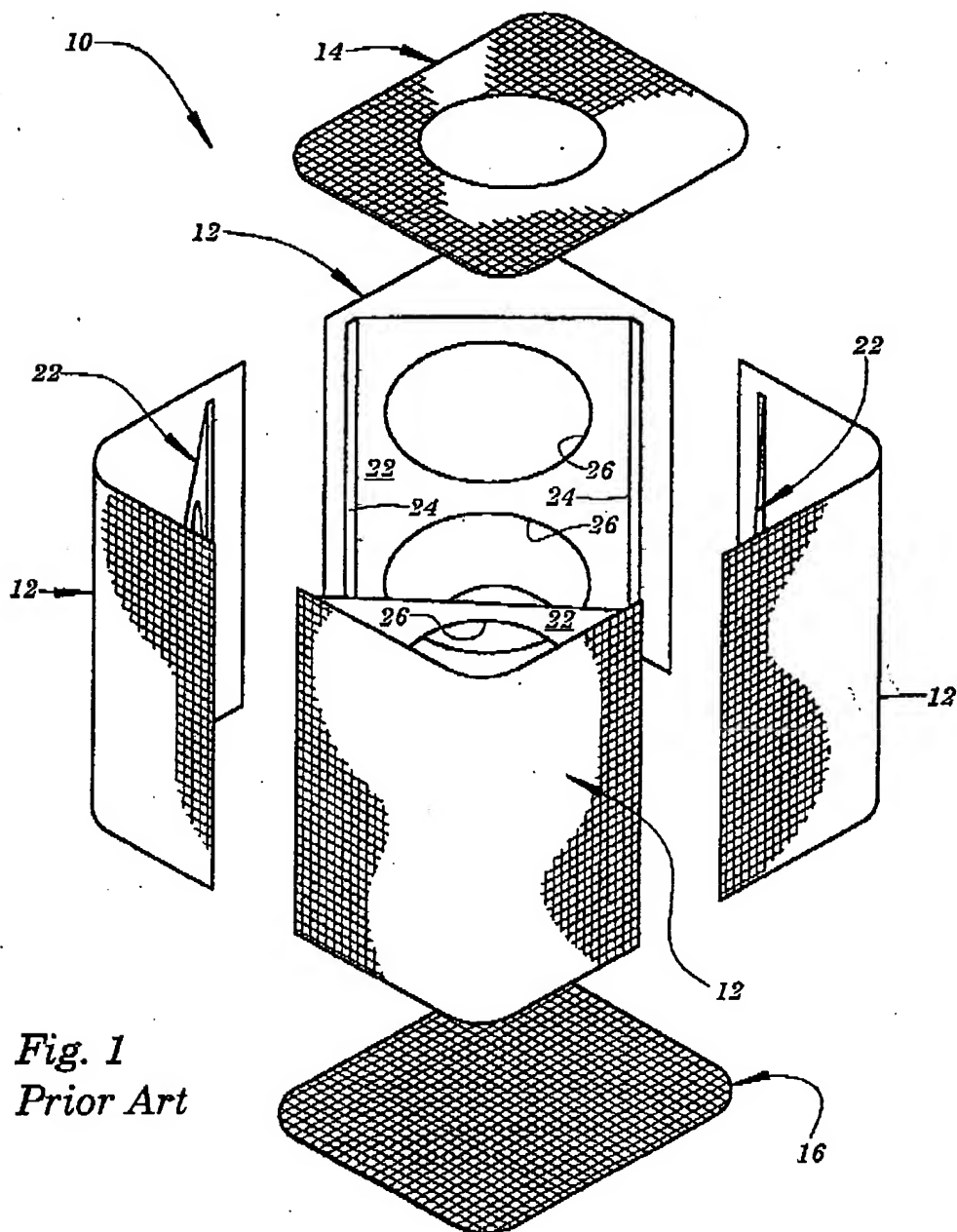


Fig. 1
Prior Art

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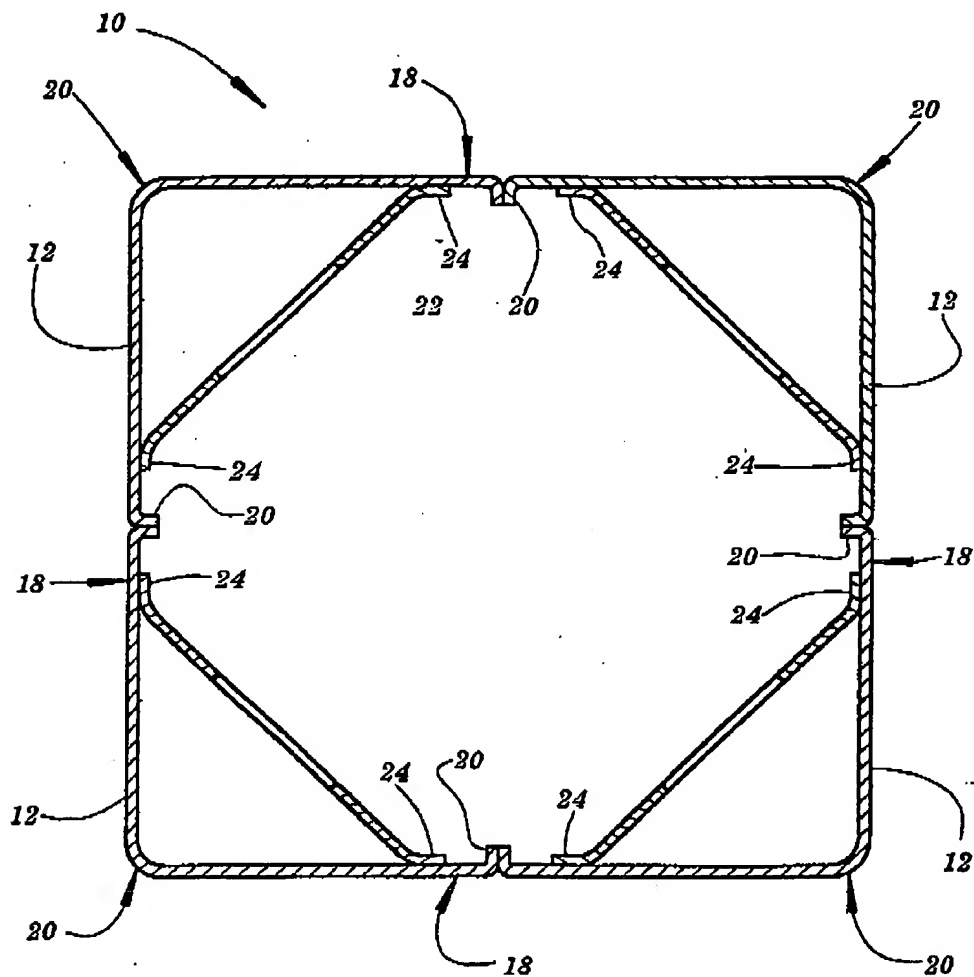


Fig. 2
Prior Art

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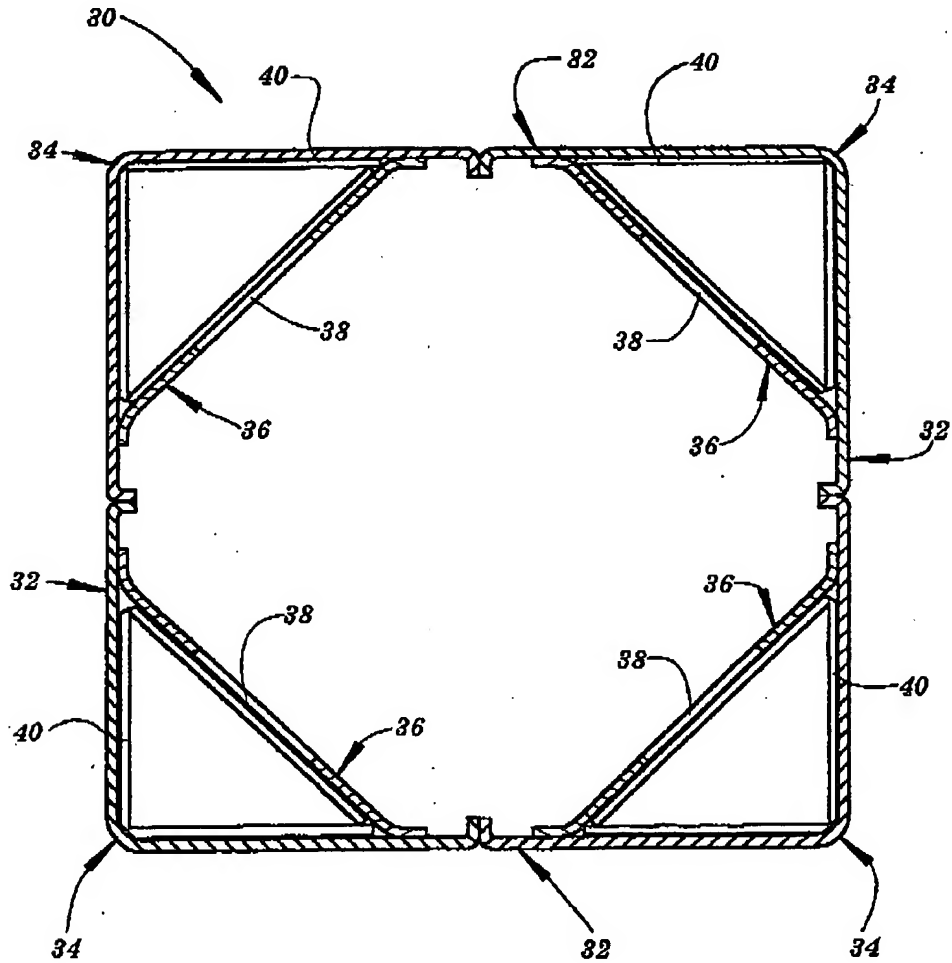


Fig. 3

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Fig. 4



Fig. 5

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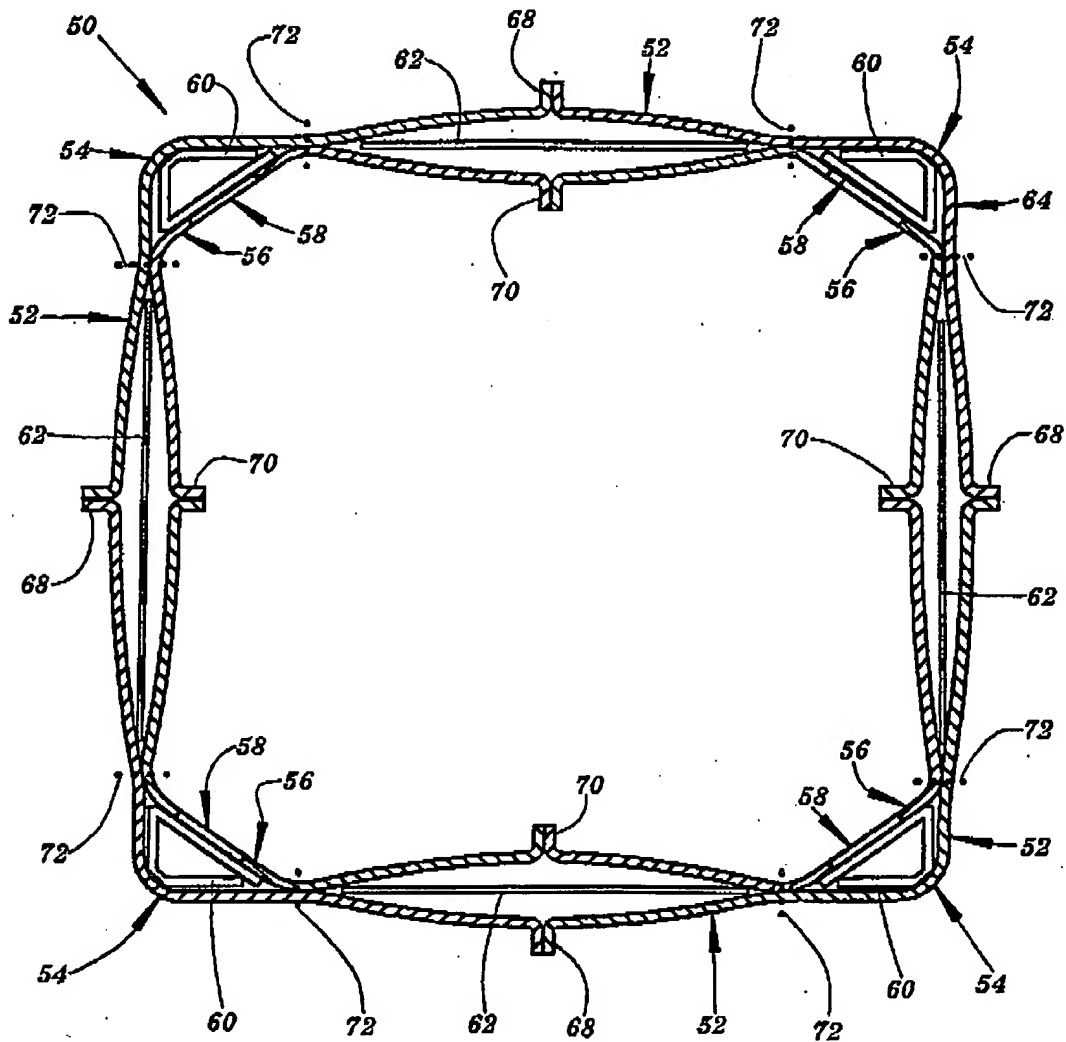
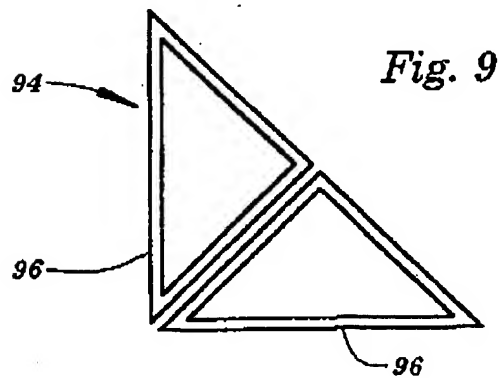
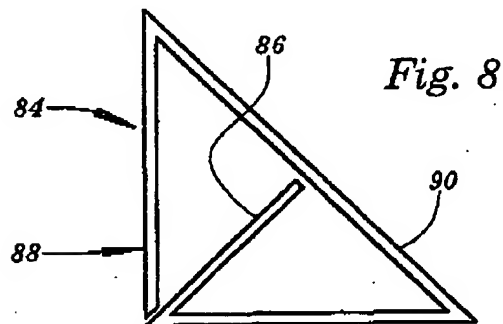
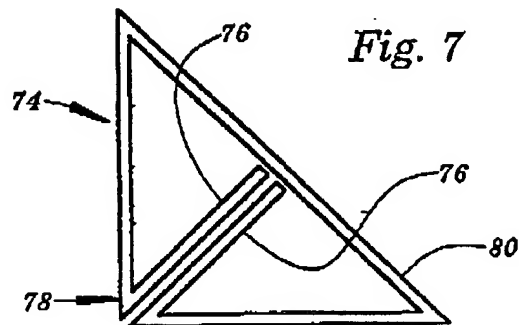


Fig. 6

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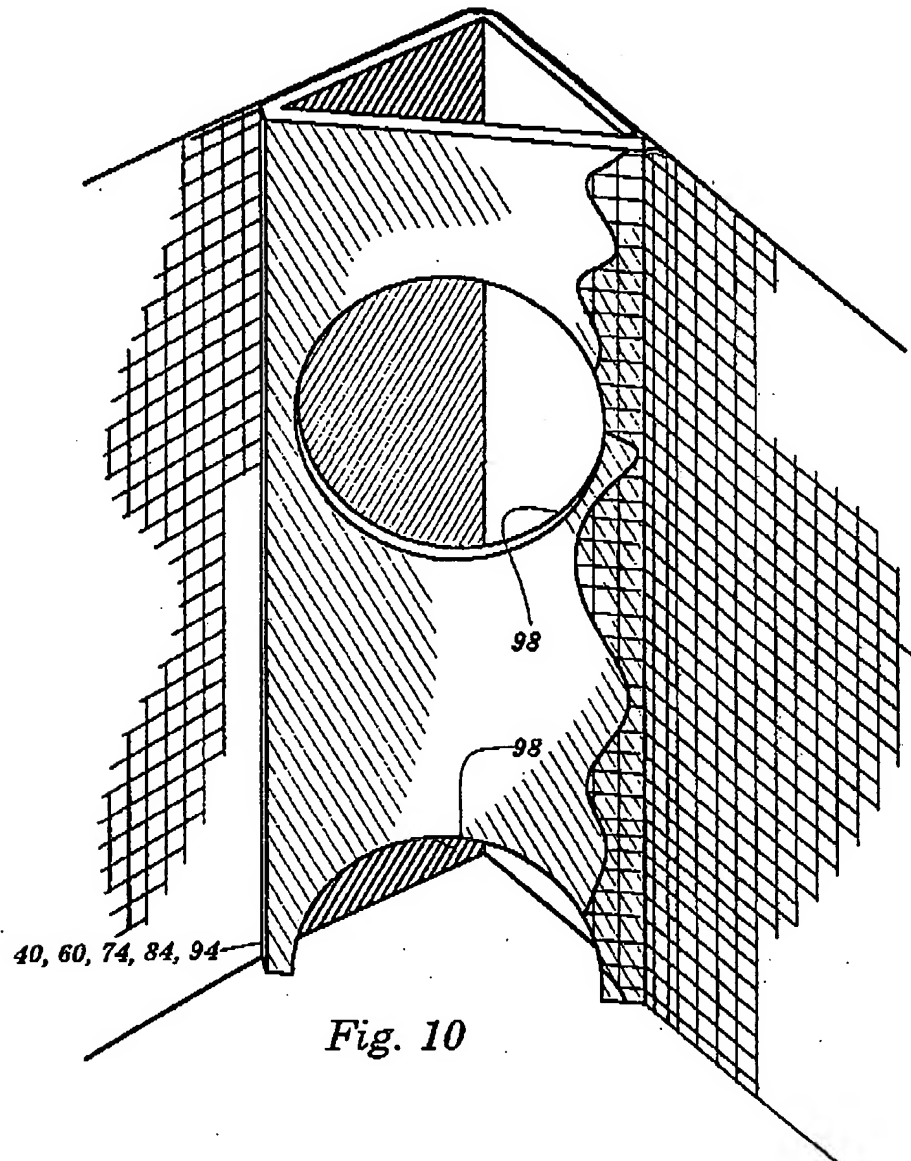
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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US00/21151

A. CLASSIFICATION OF SUBJECT MATTER IPC(7) :B65D 33/02 US CL :383/119 According to International Patent Classification (IPC) or to both national classification and IPC																				
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) U.S. : 383/119,109,105,38,903; 220/9.1,9,2 Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)																				
C. DOCUMENTS CONSIDERED TO BE RELEVANT																				
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.																		
X	US 5,289,937 A (<i>BOOTS</i>) 01 MARCH 1994, see entire document.	1-4																		
X	EP 552,845 A (<i>BOOT</i>) 28 JULY 1993, see entire document.	1-4																		
X	US 6,015,057 A (<i>STONE et al.</i>) 18 JANUARY 2000, see entire document.	5,6,9-11,15																		
Y	US 4,903,859 A (<i>DERBY et al.</i>) 27 FEBRUARY 1990, see entire document.	14																		
A	US 5,556,205 A (<i>GALLIE et al.</i>) 17 SEPTEMBER 1996, figure 6.	8,13																		
<input type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/> See patent family annex.																				
<table border="0"> <tr> <td>* Special categories of cited documents:</td> <td>"T"</td> <td>later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle of theory underlying the invention</td> </tr> <tr> <td>"A" documents defining the general state of the art which is not considered to be of particular relevance</td> <td>"X"</td> <td>document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</td> </tr> <tr> <td>"E" earlier documents published on or after the international filing date</td> <td>"Y"</td> <td>documents of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</td> </tr> <tr> <td>"L" documents which may throw doubt on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</td> <td>"&"</td> <td>documents member of the same patent family</td> </tr> <tr> <td>"O" documents referring to an oral disclosure, use, exhibition or other means</td> <td></td> <td></td> </tr> <tr> <td>"P" documents published prior to the international filing date but later than the priority date claimed</td> <td></td> <td></td> </tr> </table>			* Special categories of cited documents:	"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle of theory underlying the invention	"A" documents defining the general state of the art which is not considered to be of particular relevance	"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone	"E" earlier documents published on or after the international filing date	"Y"	documents of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art	"L" documents which may throw doubt on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&"	documents member of the same patent family	"O" documents referring to an oral disclosure, use, exhibition or other means			"P" documents published prior to the international filing date but later than the priority date claimed		
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Date of the actual completion of the international search 01 SEPTEMBER 2000		Date of mailing of the international search report 03 OCT 2000																		
Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703) 305-3230		Authorized officer ROBIN A. HYLTON Telephone No. (703) 308-1208 <i>Sheila Vanev</i> <i>Paralegal Specialist</i> <i>Technology Center 3700</i>																		

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